1. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

   Pringles wants to add 27 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?

   A. About 13 percent

   B. About 8 percent

   C. About 3 percent

   D. About 14 percent

   E. None of the above

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2. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

   Pringles wants to add 38 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?

   A. About 3 percent

   B. About 11 percent

   C. About 19 percent

   D. About 17 percent

   E. None of the above

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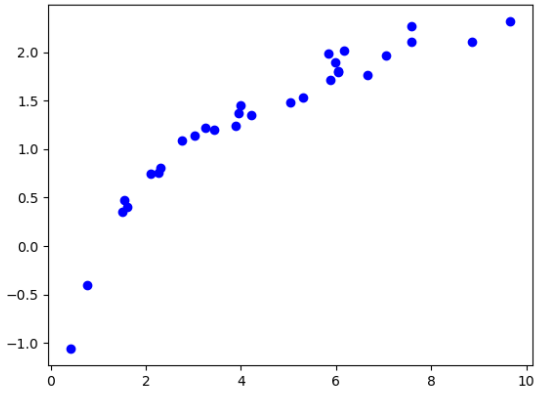
3. Determine the appropriate model for the graph of points below.



A. Logarithmic model

B. Non-linear Power model

C. Linear model

D. Exponential model

E. None of the above

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4. Solve the modeling problem below, if possible.

A new virus is spreading throughout the world. There were initially 3 many cases reported, but the number of confirmed cases has doubled every 4 days. How long will it be until there are at least 1000 confirmed cases?

A. About 34 days

B. About 14 days

C. About 24 days

D. About 16 days

E. There is not enough information to solve the problem.

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5. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 26 liter 31 percent solution of

chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 20 percent and 50 percent solutions, what was the amount she used of the 20 percent solution?

A. $9.53 liters$

B. $16.47 liters$

C. $11.85 liters$

D. $13.00 liters$

E. There is not enough information to solve the problem.

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6. The temperature of an object, T, in a different surrounding temperature T_s will behave according to the formula $T(t) = Ae^{kt} + T_s$, where t is minutes, A is a constant, and k is a constant. Use this formula and the situation below to construct a model that describes the uranium's temperature, T, based on the amount of time t (in minutes) that have passed. Choose the correct constant k from the options below.

   Uranium is taken out of the reactor with a temperature of 130° *C and is placed into a* 16° *C bath to cool. After 40 minutes, the uranium has cooled to* 63° *C.*

   A. $k = -0.02551$

   B. $k = -0.02543$

   C. $k = -0.01678$

   D. $k = -0.01640$

   E. None of the above

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7. Using the situation below, construct a linear model that describes the cost of the coffee beans $C(h)$ in terms of the weight of the low-quality coffee beans h.

Veronica needs to prepare 130 of blended coffee beans selling for $2.77 per pound. She has a high-quality bean that sells for $3.28 a pound and a low-quality bean that sells for $2.21 a pound.

A. $C(h) = 2.21h$

B. $C(h) = -1.07h + 426.40$

C. $C(h) = 2.75h$

D. $C(h) = 1.07h + 287.30$

E. None of the above.

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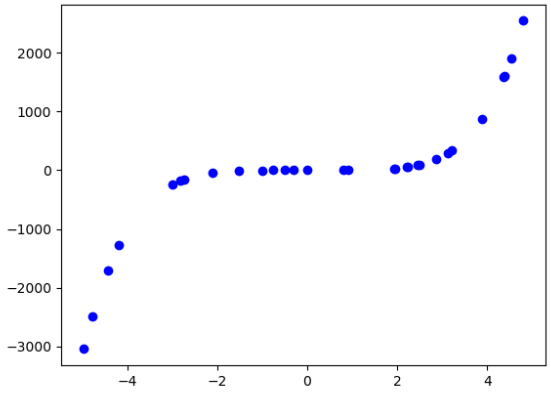
8. Determine the appropriate model for the graph of points below.



A. Non-linear Power model

B. Linear model

C. Exponential model

D. Logarithmic model

E. None of the above

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9. Solve the modeling problem below, if possible.

A new virus is spreading throughout the world. There were initially 6 many cases reported, but the number of confirmed cases has doubled

every 3 days. How long will it be until there are at least 10000 confirmed cases?

A. About 10 days

B. About 23 days

C. About 33 days

D. About 12 days

E. There is not enough information to solve the problem.

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10. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 18 liter 18 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 16 percent and 45 percent solutions, what was the amount she used of the 45 percent solution?

A. $14.98 liters$

B. $1.24 liters$

C. $16.76 liters$

D. $9.00 liters$

E. There is not enough information to solve the problem.
